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D-Bridge: A Platform for Developing Low-Cost WSN Product Solutions

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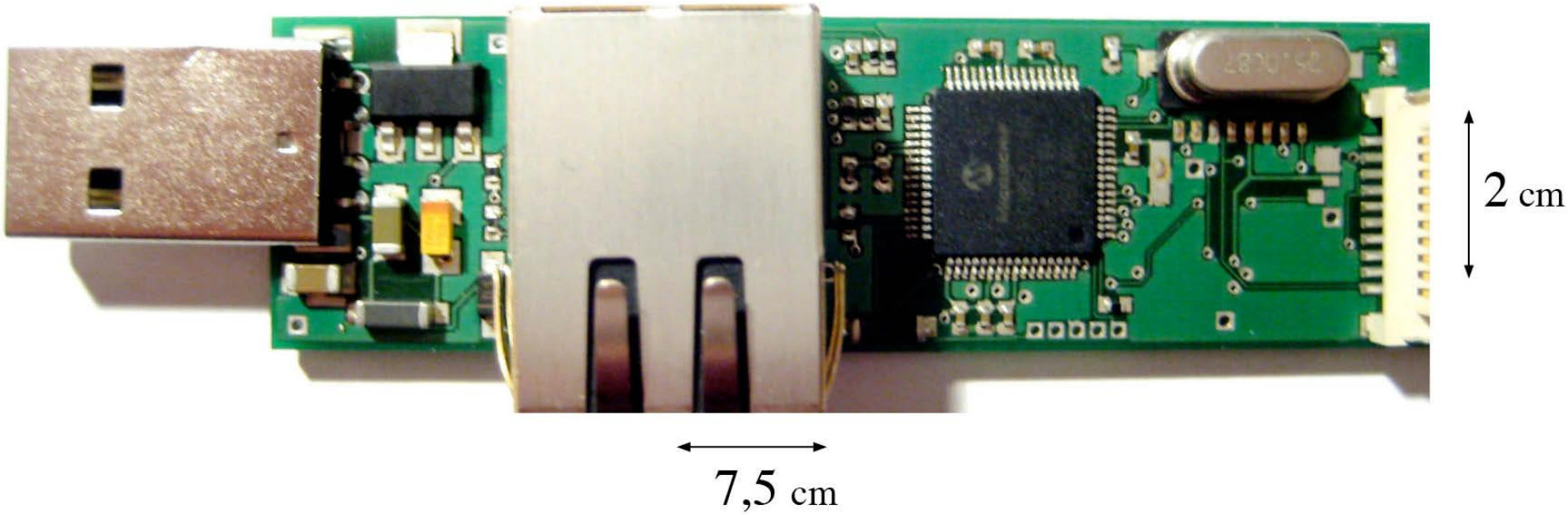
D-Bridge: Platform for Developing Low-Cost WSN Product Solutions

D-Bridge is

- Concept/Architecture
- Appliance

D-Bridge addresses

- Complexity of Development, Use
- Cost



Motivation 1: Typical Networked sensing system development

1. Buy communication electronics and adopt/integrate/test
2. Buy gateway
3. If you are lucky sensors are integrated, otherwise you buy and adopt them
4. Download, install, get familiar with complex development software tools for the networked sensing system
5. Download, install, get familiar with complex development software tools for the gateway
6. Write software for your sensor node, test, rewrite
7. Write software for your gateway, test, rewrite
8. Write software for your PC-based application, test rewrite

Motivation 2: The Cost factor

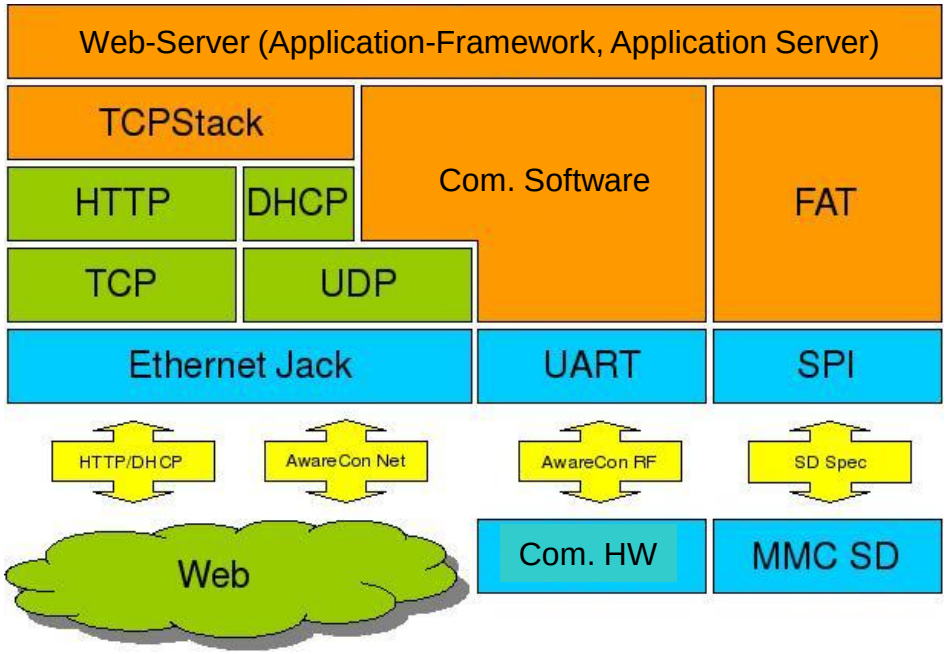
- Consider a large installation
- E.g. the Shinjuku Gyoen Gardens by our colleagues
- About 300 nodes hanging out
- This makes about 30000 Euros hanging in the trees

The solution

- An integrated approach
- Works out of the box
- Users only program when there is no other choice
- Otherwise configure
- Does not require software installation
- And is damn cheap
- Because it is damn simple

The core of the solution: D-Bridge

- **D-Bridge's basic functional components**
  - Ethernet interface,
  - Web & Application server,
  - storage,
  - Interface to the sensor network



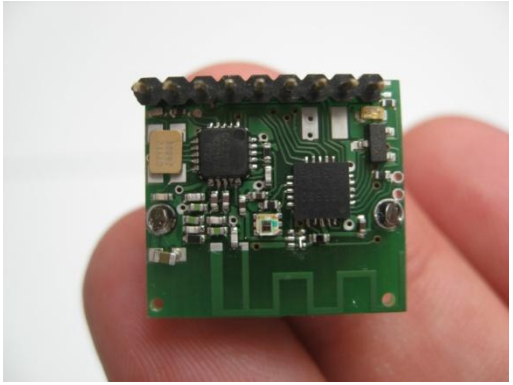
The D-Bridge System

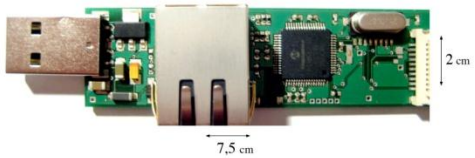
- **Gateway repeater between Internet and wireless network**
  - Repeats and transforms UDP to AwareCon packets
  - Centralizes functionality for the sensor network behind using Web-Technology

- **Web-Window to the sensor network**
  - Users can write HTML based applications directly on the D-Bridge
  - HTML-Application access functionality on the D-Bridge through server-side functions
  - E.g. you add <!-send_packet%4-!> to your HTML file, D-Bridge processor interprets send_packet(4);

Development Steps for D-Bridge approach

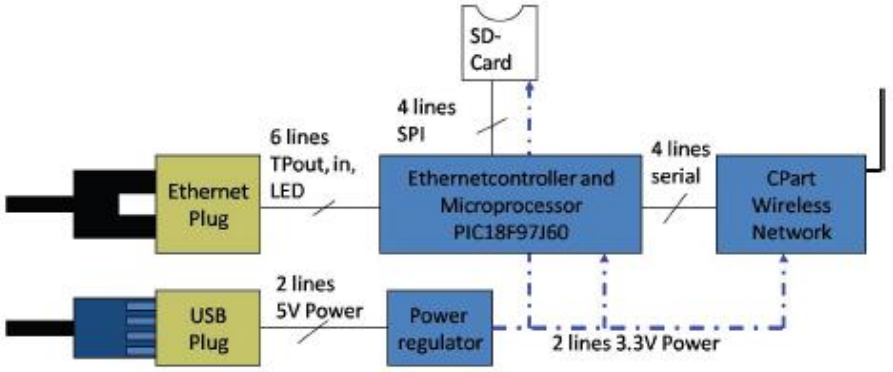
1. **Buy Hardware, connect**
2. **Access the D-Bridge via Web**
3. **Attach battery**
4. **Configure sensor nodes through the Web-Server**
   - uPart: via Java-Application from the Web-Server
   - Future Akiba: via Web-Application
5. **Maintenance through the D-Bridge Web-Server**

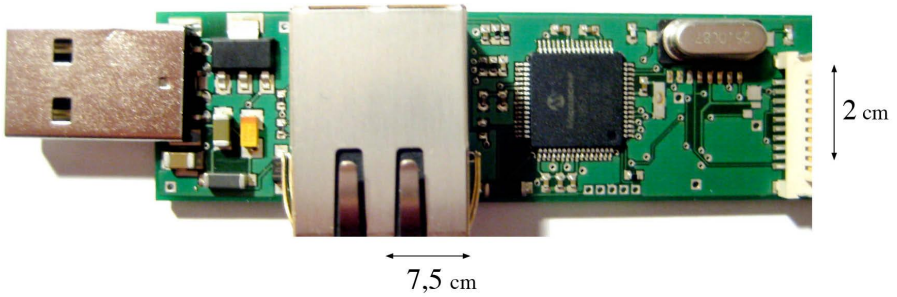




The Hardware

- **Hardware Description**
  - Simple web-server over Ethernet
  - Power over USB lowers cost
  - SD card as mass storage media lowers cost
- **Price**
  - D-Bridge 20-25 € (assumed quantity: 50 pieces, without RF part)
  - Sensor node 20-25€





Conclusion and Outlook

- **No development environment needed**
- **No software installation needed**
- **No programming of nodes needed**
- **No programming of gateways needed**

- **High portability**
- **Usable by anybody**

- **Damn cheap**

Thank You!

Questions?